

CLAIMS

1. A method for forming a semiconductor device comprising:
  - providing a semiconductor substrate;
  - forming a source region and a drain region within the semiconductor substrate, wherein the source region has a first top surface and the drain region has a second top surface;
  - 5 forming a gate dielectric over the semiconductor substrate and between the source region and the drain region;
  - forming a gate electrode over the gate dielectric, wherein the gate electrode has a third top surface;
  - 10 amorphizing a portion of the semiconductor device selected from a group consisting of the first top surface, the second top surface and the third top surface, wherein the amorphizing is performed in a chamber;
  - 15 depositing a metal over the semiconductor substrate in the chamber; and annealing the semiconductor substrate to form a metal silicide over a portion of the semiconductor device selected from a group consisting of the first top surface, the second top surface, and the third top surface.
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2. The method of claim 1, wherein amorphizing and depositing the metal further comprise using a physical vapor deposition system.
3. The method of claim 1, wherein depositing the metal further comprises  
25 sputtering a metal.

4. The method of claim 1, wherein amorphizing further comprises turning the target power substantially off.
5. The method of claim 1, wherein amorphizing a portion of the semiconductor device selected from a group consisting of the first top surface, the second top surface and the third top surface, further comprises amorphizing the first top surface, the second top surface and the third top surface.
6. The method of claim 5, wherein annealing the semiconductor substrate to form a metal silicide over a portion of the semiconductor device selected from a group consisting of the first top surface, the second top surface, and the third top surface further comprises forming a metal silicide over the first top surface and the second top surface.
7. The method of claim 1, wherein annealing the semiconductor substrate to form a metal silicide over a portion of the semiconductor device selected from a group consisting of the first top surface, the second top surface, and the third top surface further comprises forming a metal silicide over the first top surface, the second top surface and the third top surface.
8. The method of claim 1, wherein annealing the semiconductor substrate to form a metal silicide further comprises forming non-reacted metal, and the method of claim 1 further comprises:  
removing the non-reacted metal; and  
annealing the semiconductor substrate after removing the non-reacted metal.

9. A method for forming a semiconductor device comprising:
  - providing a semiconductor substrate having a top surface comprising silicon;
  - 5 amorphizing the top surface of the semiconductor substrate using a sputtering system, wherein the sputtering system comprises a sputtering target; and
  - setting the target power of the sputtering system so that substantially no power is supplied to the sputtering target.
- 10 10. The method of claim 9, wherein amorphizing further comprises bombarding the top surface of the semiconductor substrate with ions in a physical vapor deposition system.
- 15 11. The method of claim 9, further comprising:
  - sputtering a metal on the top surface using the sputtering system; and
  - reacting the metal with the top surface to form a metal silicide.
12. A method for forming a semiconductor device comprising:
  - 20 providing a semiconductor substrate having a top surface;
  - bombarding the top surface of the semiconductor substrate with ions to alter the material structure of at least a portion of the top surface using a deposition system;
  - depositing a metal over the top surface; and
  - 25 reacting the metal with the top surface.

13. The method of claim 12, wherein depositing the metal over the top surface further comprises depositing the metal over the top surface using the deposition system.

5      14. The method of claim 13, wherein depositing the metal and bombarding the top surface occur in the same chamber.

15. The method of claim 12, wherein reacting the metal further comprises annealing the semiconductor substrate.

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16. A method of forming a semiconductor device comprising:  
      providing a semiconductor substrate comprising a crystalline portion,  
          wherein the crystalline portion comprises silicon;  
      changing the crystalline portion to an amorphous portion using a chamber  
15           in a deposition tool; and  
      depositing a metal on the amorphous portion in the deposition tool.

17. The method of claim 16, further comprising:

reacting the metal with the amorphous portion to form a metal silicide.

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18. The method of claim 16, wherein depositing the metal further comprises depositing the metal in the chamber.

19. The method of claim 16, wherein changing the crystalline portion to an

25   amorphous portion further comprises bombarding the crystalline portion with ions.

20. The method of claim 16, wherein depositing the metal further comprises depositing a metal selected from the group consisting of cobalt and nickel.
- 5      21. The method of claim 16, wherein the depositing tool is a sputtering tool.